DEPARTMENT OF DEFENSE

DoD Enterprise Architecture Performance Reference Model

v0.04

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By
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Enterprise Architecture FY07 IT300 Analysis for DoD Program Managers

Introduction

The DoD Enterprise Architecture Congruence Community of Practice (DoD EAC CoP) is chartered under the authority of the DoD CIO to develop and institutionalize a uniform DoD Enterprise Architecture (EA) across the three DoD and, in particular, the three pillar processes of capability development, resource management, and acquisition. Further, the Office of Management and Budget (OMB) requires Cabinet-level Departments and Agencies to align their enterprise architecture with the Federal Enterprise Architecture (FEA) as part of the capital planning process. DoD programs are required to submit Exhibit 300 Budget Submissions that detail the content of their enterprise architecture in addition to other information.

To meet the requirements of OMB to align DoD architectures with the FEA and to facilitate the Exhibit 300 Budget Submission process for DoD Program Managers (PMs), the DoD EAC CoP developed the DoD EA Reference Model (DoD EA RM). The DoD EA RM is a set of five reference models that directly align with the five FEA RMs. Because the DoD EA RMs use DoD resources and language, PMs can more easily prepare the Exhibit 300s. The alignment between the DoD and FEA RMs allow PMs to identify the lines of business, service components, data, technical, and performance information for the Exhibit 300s in DoD-speak rather than have to "translate" from federal government terms and information.

DoD Program Managers submitted Exhibit 300s to OMB for FY2007 as part of the OMB requirement for submission of capital planning information. A section of the Exhibit 300 addresses Enterprise Architecture. This section requires DoD Program Managers to document how a program is aligned with the FEA Business, Service Component, Technical, Data, and Performance Reference Models.

Representatives of the Services and DoD organization reviewed the submissions. Errors found by the reviewers were documented in the FY07 BES DoD Exhibit 300 Scoring Information for Enterprise Architecture. In addition to identifying errors, the purpose of the review process was to advise program managers of ways to correct the errors in order to achieve better scores in future submissions. It is important for the information submitted via the Exhibit 300s to be correct because it is used to identify the viability of the program as well as gaps, redundancies, and overlaps in the proposed and fielded systems.

Purpose

The purpose of this document is to provide information for program managers to identify common errors, therefore saving time and effort and increasing their scores for future submissions.

Intended Use

Program managers and others who prepare and review the Exhibit 300 submissions at all stages of development should use this document to help identify and avoid common errors. DoD and Office of Management and Budget (OMB) should use as a basis to modify Exhibit 300 instructions where previous instructions appear to have been misunderstood by many preparers..

IT300 Enterprise Architecture Submission Analysis

The DoD EA CoP analyzed the errors and the corrections recommended by the reviewers. The following documents the results of the analysis for the benefit of DoD preparers of future Exhibit 300 submission:

There are three sections in this document. The first section presents in table format and also discusses the common errors identified by the reviewers for 73 major programs. The common errors identified are from the Scoring Area for Enterprise Architecture in Section II.A.1.E 11 (BRM); Section II.A.3.A (SRM); and Section II.A.3.C (TRM). Each of the sections was scored twice, by two of ten assigned reviewers. The table for each section lists the most common errors and the number of times they occurred from the perspective of the two reviewers. The discussion of the common errors describes the information in more detail.

The second section of this document pertains to errors related to the Performance Reference Model (PRM). Though there are no questions regarding the PRM in the Enterprise Architecture section of the scoring information, there are several sections (1.B - Justification, the Line of Business (LOB) Table and Table 2) in the Exhibit 300 Budget Submission that directly relate to the PRM. This section of the document includes the methodology used to analyze the PRM input and the identification of common errors. It also includes an example of an original submission with errors and a corrected version to aid PMs in avoiding the common errors.

The third section summarizes the general issues in the Exhibit 300 submission preparation process.

Section 1

Business Reference Model

The majority of errors in Section II.A.1.E were related to the Unique Project Identifier (UPI) and LOB Table. The following are guidelines for use of the UPI and LOB Table:

- The last six digits of the UPI must be the Primary LOB and the Sub-Function, respectively.
- The Primary LOB and Sub-Function, and therefore the UPI, must reflect the LOB and Sub-Function most directly related to the program.
- The Primary LOB/Sub-Function is NOT repeated in the LOB Table. Secondary LOB/Sub-Functions are listed in order of importance in the LOB Table.
- If the Primary LOB is a Service for Citizens, there must also be a Mode of Delivery listed, most likely Military Operations, in the LOB Table.
- Mode of Delivery is always a Secondary LOB; never a Primary.
- If there is only a Primary LOB and it is not a Service for Citizens, there will be no entry in the LOB Table.
- 999 is no longer an accepted number for an unknown Sub-Function. All LOBs have associated Sub-Function codes that should be used.
- Ensure that the LOB and the Sub-Function are not obsolete (the FEA BRM has been updated).
- Each LOB has a set of related Sub-Functions. It is not correct to mismatch an LOB with an unrelated Sub-Function.
- LOBs identified must be those most directly related to the program to ensure that overlaps, gaps and redundancies of programs may be properly identified.

For the entries in the following table related to the PRM, the errors noted by the reviewers were primarily mismatches between Measurement Categories and Areas or Measurement Groupings and Measurement Indicators. In the former category, the categories and areas do not relate as required (similar to LOB/Sub-Function problem); in the latter, there appeared to be confusion as to what should be a grouping and what should be an indicator. Preparers should read the instructions to clarify these descriptions.

The following table lists the common errors and how often they occurred in a total of 73 submissions. There were two sets of reviews for each answer; therefore two sets of identified errors per each answer. There are differences between the sets of reviews, as noted by the differing numbers, but both sets reflect the general results.

Table 1: Type and number of common errors in BRM section of Enterprise Architecture

Enterprise Architecture, Section II.A.1.E (BRM)	Set 1	Set 2
Incorrect or obsolete LOB or Mode of Delivery used as Primary LOB in UPI	26	32
999 used as Sub-Function in UPI	8	7
LOB/Sub-Function listed both in UPI as Primary and in BRM Table as Secondary	3	6

Mismatched LOB and Sub-Function for Primary UPI	2	2
Mismatched or obsolete LOB and Sub-Function in BRM Table as Secondary	14	7
Incorrect LOB for mission or additional LOB needed	14	3
PRM: entries incomplete/incorrect (i.e., mis-categorized as Measurement Groupings instead of Measurement Indicators)	1	3
PRM: Mismatched Measurement Category and Measurement Area	10	6

Service Component Reference Model

The most significant error in answering the SRM-related question was that an inadequate description of components for the *Relation to SRM* field was entered. The description should include how your program/system provides the functionality associated with the component listed. The entries for which an error was reported generally entered a generic boilerplate description of the component, not a description of the functionality for your program/system specifically.

It is also important to identify the components that are most directly related to the mission. Further, only five components are allowed to be listed - many preparers listed all possible components with no regard to weighing the importance or precedence of each. This diminishes the value of the information as there is no way to judge which is most important; too many components also limits the ability to compare effectively with other programs/systems.

As in the BRM errors, mismatches between the Domain and Type and/or the Type and Component were common in the SRM. The FEA has been structured to relate the categories in a specific way. It is not correct to use, for example, one Domain with a Type from another Domain.

The following table lists the common errors and how often they occurred in a total of 73 submissions. There were two sets of reviews for each answer; therefore two sets of identified errors per each answer. There are differences between the sets of reviews, as noted by the differing numbers, but both sets reflect the general results.

Table 2: Type and number of common errors in SRM section of Enterprise Architecture

Enterprise Architecture, Section II.A.3.A (SRM)	Set 1	Set 2

Mismatched Domain/Type or Type/Component	12	17
Too many entries listed	24	29
Description inadequate for functionality/relation to SRM	23	14
Inappropriate entry for most direct relationship to mission	13	2
Incorrect entries	9	1

Technical Reference Model

The TRM is closely related to the SRM. First, the number of entries should directly correspond to the components you listed in the SRM question. The *Relation to SRM* field should correspond to the name of the each SRM component listed. This reflects the link between the SRM and the TRM that is required.

Secondly, the descriptions in the Service Specification field are lacking in many of the submissions. This field requires entries specific to your program/system. The actual name of the COTs software used to implement the Service Standard should be listed, not a generic name. If the software has already been purchased, list the vendor and product.

Additionally, mismatches between Service Standards and Service Specifications were noted as errors by the reviewers. The FEA has been structured to relate the categories in a specific way. It is not correct to use, for example, one Service Standard with a Service Specification from another Service Standard.

The following table lists the common errors and how often they occurred in a total of 73 submissions. There were two sets of reviews for each answer; therefore two sets of identified errors per each answer.   There are differences between the sets of reviews, as noted by the differing numbers, but both sets reflect the general results.

Table 3: Type and number of common errors in TRM section of Enterprise Architecture

Enterprise Architecture, Section II.A.3.C (TRM)	Set 1	Set 2
Doesn't correspond with SRM	37	45
More than one entry per component	15	11
Incomplete data	6	4
Technical description incomplete (i.e., Vendors and Products, functionality, actual equipment)	17	13
Generic re specific COTs	12	6

listed		
Incorrect data and/or column content	13	2
Mismatched Service Standards and Specifications or other mismatches	8	19

Section 2

Performance Reference Model

Analysis using Section 1.B, Justification; Section II.A.1, LOB Table; and Section I.C., Table 2

The *FY07 Budget Formulation, FEA Consolidated Reference Model Document* provides information and OMB Circular A-11, Part 7, *Planning, Budgeting, Acquisition, and Management of Capital Assets* specifies the necessary steps to completing the PRM for Budget Estimates for DoD programs. Many of the submissions for 2004 were incorrect in their format and content; therefore a comparison of an incorrect submission of PRM information to a correct version may be helpful to program managers to avoid common errors.

The methodology for comparison was as follows:
1. Compile the PRM content from an original submission
    a. Select an original Budget Estimate from the 2004 submissions
    b. Extract the text from 1.B. Justification section, #1, #2, and #8
    c. Extract the LOB Table from Section II.A.1 and Table 2 from Section I.C.
2. Review and analyze PRM content from the original submission
    a. Review and analyze the text from the 1.B. Justification section, #1, #2, and #8 to identify the correct related LOB and Table 2 information
    b. Identify errors and/or gaps in the LOB Table and Table 2 based on the text
3. Update the LOB Table and Table 2 information from the original submission to create a corrected version of the PRM information.

EXAMPLE OF INCORRECT EXHIBIT 300 PRM INFORMATION

Name of Investment:
DEFENSE MESSAGE SERVICE - ARMY

Unique Project (Investment) Identifier:
007-21-05-12-01-0145-00-201-067

1.B. Justification

1. How does this investment support your agency's mission and strategic goals and objectives?

DMS is an NSS system providing command and control message support to the Warfighter. Consistent with Joint Staff validated requirements contained in the DEFENSE MESSAGE SYSTEM (DMS) Multi-Command Required Operational Capability (MROC) Document, dated 1 October 1997, this project supports DoD requirements to provide message service to all DoD users via the DoD Global Information Grid (GiG), to include deployed tactical users, access to and from worldwide DoD locations, and interface to other US government, allied, state and local government, and Defense contractor users as needed. DMS reliably handles information of all classification levels (unclassified to TOP SECRET), compartments, and handling instructions. In addition to maintaining high reliability and availability, DMS must interoperate with approved legacy message systems, formats and protocols. The DMS shall be a vehicle for planned growth and technology insertion. It shall be based upon the principles of standardization and interoperability, and use of commercial-off-the-shelf (COTS) capability, while preserving adaptability to implement approved Service and Agency unique functions. DMS supports the DoD and Department of the Army to provide a campaign quality force capable of power projection in support of National Security Policy. DMS also supports the Joint Chiefs of Staff Joint Vision 2010 of delivering network based message capabilities which enable decision superiority and information dominance to Warfighters.

2. How does it support the strategic goals from the President's Management Agenda?

DMS supports the President's Management Agenda of Strategic Sourcing by replacing the need for "Government Only" Telecommunications Centers, which was the case when AUTODIN, the NSS forerunner to DMS, was in operation. DMS makes maximum use of COTS software, hardware, and has opened the way for aspects of DMS support such as Directory database design, operation, and systems administration, to be provided through commercial sources with some level of Government monitoring. The program also provides joint interoperability for DOD, allied and coalition forces.

DMS supports the President's Management Agenda of competitive sourcing by leveraging contractor logistics, engineering, technical and budgetary support.

DMS supports the PMA Agenda initiatives of improved financial performance and budget and performance integration by significantly reducing the number of labor intensive LCCs from 65 - to 2 automated LCCs. In addition, through the budget, POM and acquisition process, DMS performs routine program reviews to continuously assess operational requirements and validate those requirements, and associated monetary and human resources, to ensure maximum benefit and capitalization.

DMS supports the President's Management Agenda of expanding electronic Government by providing a secure, protected, and assured means of composing and transmitting highly sensitive or classified information throughout the DoD. This is especially supportive of financial transaction or proprietary information, which must be accorded protection from intrusion or other malicious activity. DMS, with its' Public Key and National Security Agency developed FORTEZZA offers significant protection from this risk while also insuring authentication, data integrity, and non-repudiation.

8. How will this investment reduce costs or improve efficiencies?

DMS reduces costs, improves efficiencies and supports the Army's warfighting mission by providing a single, secure, global interservice messaging capability extending from the sustaining base to the tactical environment. DMS/TMS enables the closure of obsolete, resource-intensive telecommunications centers, which was required by its' predecessor AUTODIN. DMS functionality is now extended to the operator or desktop level and anyone with a need to know and appropriate access can compose and route communications and disseminate information to appropriate parties without leaving the desk. Additionally, DMS provides a standard set of tools and procedures to compose and transmit messages whereas previously, several non-compatible tools and variable procedures were used by each DoD Branch of Service to accomplish the single task of creating, transmitting, and delivering messages critical to military operations.

Line of Business (LOB) Table

Line of Business	Sub-function
Defense and National Security	Strategic National and Theater Defense
Direct Services for Citizens	Military Operations
Information and Technology Management	Information Management

Table 2

Fiscal Year	Measurement Area	Measurement Category	Measurement Indicator	Baseline	Planned Improvements to Baseline	Actual Results
2005	Technology	Reliability and Availability	System availability	Availability = 99%	Availability > 99%	Data not available
2005	Technology	Reliability and Availability	Error rate	Error rate = 2%	Error rate < 2%	Data not available
2005	Customer Results	Effectiveness	Plain language address to domain name associations	Correct associations = 95%	Correct associations > 95%	Data not available
2006	Technology	Reliability and Availability	System availability	Availability = 99%	Availability > 99%	Data not available
2006	Technology	Reliability and Availability	Error rate	Error rate = 2%	Error rate < 2%	Data not available
2006	Customer Results	Effectiveness	Plain language address to domain name associations	Correct associations = 95%	Correct associations > 95%	Data not available

The review and analysis of the original submission reveals several gaps/errors:

- The last six digits of the Unique Project (Investment) Identifier are incorrect. The first three digits of the six digit set should be the number assigned to the primary Line of Business (LOB); the second three digits of the six digit set should be the number assigned to the Subfunction (see Figures 8, 9, and 10 in the *FY07 Budget Formulation, FEA Consolidated Reference Model* at egov.gov, Federal Enterprise Architecture, Related Links for the correct numbers assigned to the LOBs and Sub-Functions).
- The primary LOB should not be listed in the LOB Table. This is because it is already identified through the last six digits of the Unique Project (Investment) Identifier (UPI).
  Note: The Mode of Delivery (in the case of a Services for Citizens LOB) should be listed in the table, as well as any LOBs that are non-primary. It is possible that this table could be left blank if the LOB/Subfunction selected is from one of the other Business Areas, such as Support Delivery of Services, or Management of Government Resources (that do not have a related Mode of Delivery) and if there is no other non-primary LOB.
- Only *Customer Results* and *Technology* are addressed in Table 2. *Mission and Business Results* and *Processes and Activities* categories for the Measurement Area column in Table 2 should also be addressed per the *FY07 Budget Formulation, FEA Consolidated Reference Model.* Additionally*, Human Capital* and *Other Assets* measurement areas are not required for current Budget Estimates, but will be required in the future.
- The addition of *Mission and Business Results* and *Processes and Activities* requires analysis of the text in 1.B. Justification, particularly #8, in order to correctly fill out the Measurement Indicator, Baseline, and Planned Improvements to the Baseline columns for those measurement areas if in fact the investment is related to process improvement. If you are planning to gain efficiencies the measure that you plan to track should be identified and recorded in the table.

There is no Measurement Grouping column in Table 2. This is not an error for this submission because it is a new requirement of the *FY07 Budget Formulation, FEA Consolidated Reference Model* but it is pointed out as it is a requirement for future submissions.

The corrected version of the Budget Submission addresses the gaps/errors in the original submission and follows for review.

EXAMPLE OF CORRECT EXHIBIT 300 PRM INFORMATION

Name of Investment:
DEFENSE MESSAGE SERVICE - ARMY

Unique Project (Investment) Identifier:
007-21-05-12-01-0145-00-103-210

1.B. Justification

1. How does this investment support your agency's mission and strategic goals and objectives?
DMS is an NSS system providing command and control message support to the Warfighter. Consistent with Joint Staff validated requirements contained in the DEFENSE MESSAGE SYSTEM (DMS) Multi-Command Required Operational Capability (MROC) Document, dated 1 October 1997, this project supports DoD requirements to provide message service to all DoD users via the DoD Global Information Grid (GiG), to include deployed tactical users, access to and from worldwide DoD locations, and interface to other US government, allied, state and local government, and Defense contractor users as needed. DMS reliably handles information of all classification levels (unclassified to TOP SECRET), compartments, and handling instructions. In addition to maintaining high reliability and availability, DMS must interoperate with approved legacy message systems, formats and protocols. The DMS shall be a vehicle for planned growth and technology insertion. It shall be based upon the principles of standardization and interoperability, and use of commercial-off-the-shelf (COTS) capability, while preserving adaptability to implement approved Service and Agency unique functions. DMS supports the DoD and Department of the Army to provide a campaign quality force capable of power projection in support of National Security Policy. DMS also supports the Joint Chiefs of Staff Joint Vision 2010 of delivering network based message capabilities which enable decision superiority and information dominance to Warfighters.

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DMS supports the President's Management Agenda of Strategic Sourcing by replacing the need for "Government Only" Telecommunications Centers, which was the case when AUTODIN, the NSS forerunner to DMS, was in operation. DMS makes maximum use of COTS software, hardware, and has opened the way for aspects of DMS support such as Directory database design, operation, and systems administration, to be provided through commercial sources with some level of Government monitoring. The program also provides joint interoperability for DOD, allied and coalition forces.

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Line of Business (LOB) Table

Line of Business	Sub-function
Mode of Delivery	Military Operations
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Table 2

Fiscal Year	Measurement Area	Measurement Category	Measurement Grouping	Measurement Indicator	Baseline	Planned Improvements to Baseline	Actual Results
2005	Mission/Business Results	Defense and National Security	Strategic National and Theater Defense	Single, secure, global interservice messaging capability extending from the sustaining base to the tactical environment	"Government Only" telecommunications centers	Closure of obsolete, resource-intensive telecommunications centers: DMS functionality extended to the operator or desktop level; standard set of tools and procedures	Data not available
2005	Customer Results	Service Quality	Information Management	Plain language address to domain name associations	Correct associations = 95%	Correct associations > 95%	Data not available
2005	Processes and Activities	Productivity and Efficiency	Information Management	Number of LCCs necessary	LCCs = 0	LCCs = 2 automated	Data not available
2005	Technology	Reliability and Availability	Information Management	System availability; Error rate	Availability = 99%; Error rate = 2%	Availability > 99%; Error rate < 2%	Data not available
2006	Mission/Business Results	Defense and National Security	Strategic National and Theater Defense	Single, secure, global interservice messaging capability extending from the sustaining base to the tactical environment	"Government Only" telecommunications centers	Closure of obsolete, resource-intensive telecommunications centers: DMS functionality extended to the operator or desktop level; standard set of tools and procedures	Data not available
2006	Customer Results	Service Quality	Information Management	Plain language address to domain name associations	New baseline after rebaselining from improvements achieved in 2005	Correct associations > 95%	Data not available
2006	Processes and Activities	Productivity and Efficiency	Information Management	Number of LCCs necessary	New baseline after rebaselining from improvements achieved in 2005	LCCs = 2 automated	Data not available
2006	Technology	Reliability and Availability	Information Management	System availability; Error rate	New baseline after rebaselining from improvements achieved in 2005	Availability > 99%; Error rate < 2%	Data not available

Section 3

Summary and Conclusion

Many common errors were identified in all the reference models. This analysis seems to indicate several systemic problems that need to be addressed:

- Enterprise Architects are not filling out the EA section
- The instructions provided both by DoD and OMB are not being read or followed
- There is a lack of fundamental understanding of the relationship of IT investments and the mission and performance of the enterprise
- A more thorough understanding of the guidance by preparers is necessary, perhaps leading to a prepares' training session